The Problem of

STATE INSTITUTE OF EDUCATION * BANIPUR *

LARGE CLASSES

(Some Suggestions)

DEPARTMENT OF CURRICULUM METHODS AND TEXTBOOKS
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH & TRAINING

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FOREWORD

We educators have always been taught to look upon a small class as the ideal unit for teaching. But, however desirable a small class may be, it remains, at least in developing countries, only a coveted ideal distant of attainment. Large classes are the order of the day and there are few indications that the pressure on class-size would be relieved in the near future.

This study on 'Large Classes' and 'Effective Teaching' was suggested to us by Shri Raja Roy Singh, former Joint Director of the National Council of Educational Research and Training who desired the Department to make a study of the problem : 'How to Make Teaching Effective in Large Classes'. The scope of the problem, however, is a very wide one, and it was not feasible to undertake a full-scale study which cannot be regarded complete without actual experimentation in schools. The scope was, therefore, delimited and the conclusions presented in these pages are based chiefly on the opinions and practices of more than 450 experienced teachers and administrators in Delhi.

This brochure, as will be seen, contains also a number of suggestions meant to obviate the difficulties of the teacher who has to handle large classes. The validity of these suggestions which are of course in the nature of untested hypothesis can only be proved if schools and teachers work out these suggestions in the classroom situation and find them workable.

Kumari (now Shrimati) Adarsh Khanna conducted this study and has also prepared the final report. Shri T.R. Kakkar has helped her substantially in compiling the statistical information and presenting it in the form of tables.

Our grateful thanks are due to the Director of Education, Delhi, and the schools, teachers, principals and inspectors who have helped us in this project. Special mention may here be made of Dr. (Kumari) A. Nanda, Assistant Director of Education, Delhi, and of Mr. E. Edwards, Secretary, Inter-State Board of Anglo-Indian Education, both of whom have materially contributed towards bringing this study to a successful conclusion.

B. GHOSH
Head of the Department,
Department of Curriculum,
Methods and Textbooks

New Delhi
January 15 1965.

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CHAPTER I

THE STUDY

The study had its starting point in a note from the Joint Director, National Council of Educational Research and Training which is quoted below :

> The enrolment in schools has been expanding rapidly. In consequence the number of pupils in classes has increased and classes are becoming large-sized.
>
> It is popularly and perhaps correctly believed that the size of a class should be such as can be managed on the basis of individual attention by teacher. But how big can a class be ? Does the requirement of size differ from subject to subject ? Furthermore, considering the financial resoures it may not be immediately possible to reduce class-size. Reduction of class-size means construction of more classrooms and appointment of additional teachers. Is it possible to find out ways and means of so organizing the school work that disadvantages of large classes are

mitigated ? Are there some subjects in which a small class is more essential than in other subjects ?

Are there methods of teaching which can overcome the disadvantage of large classes ? Any study that makes a realistic contribution to handling large classes without any undue loss and effectiveness of teaching would be a gain of the first order.

PRELIMINARY PREPARATION

The problem of large classes has never been systematically probed into in India. As a first step, therefore, the researches reported in other countries, notably in the U.S.A. were studied, and the study resulted in a working paper: 'Class-size and Effective Teaching' (Appendix I).

This working paper was submitted before a meeting (Appendix IV. 1. gives the list of persons who attended) specially called for the purpose. The meeting discussed the paper thoroughly and helped the Department to formulate concretely the purposes of the study.

PURPOSE OF THE STUDY

Because of some difficulties inherent in a scientific and rigorous study of the problem—such as reliable and agreed definitions of 'large classes' 'effective teaching', it was decided in the first instance to conduct a pilot study and to limit the purposes to the following:

- —To study the problems of large classes with a view to suggesting suitable classroom organization and procedures helpful in meeting the problems.
- —To suggest methods found useful for effective teaching in large classes.

SCOPE OF THE STUDY

In view of the limited purposes of the study, the scope was also delimited as follows:

- —The study was confined to the Delhi State.
- —The classes studied were VI and IX.
- —The subjects with reference to which the problem was studied were restricted to Hindi and mathematics.

PROCEDURE

1. The problem of large classes in Delhi schools was first discussed with some Inspectors of Schools and at the same time the rules of the Delhi Directorate of Education prescribing class-size were studied.

2. A group of local inspectors and principals (Appendix IV. 2) was invited to discuss the problem on the basis of their experience and to offer suggestions in solving it.

3. Two groups of teachers (Appendix IV. 3)—one for mathematics and the other for Hindi were then invited to take a closer look at the specific issues related to the teaching of these two subjects. (These teachers were selected by the officers of the Directorate of Education).

4. Side by side, an unstructured questionnaire (Appendix II) meant for teachers teaching Hindi and mathematics in classes VI and IX was prepared. It was so designed as to allow full scope to teachers to express themselves freely.

The questionnaire was intended to pool the opinions and experience of the teachers on:

- —the size of the large class from the point of view of effective teaching.
- —the handicaps presented by the large size of a class.
- —factors or handicaps in the school coming in the way of effective handling large classes,

- —classroom organization and procedures found helpful for large classes.
- —methods found useful for effective teachings in large classes. and
- – teaching aids found useful for large classes.

The questionnaire was sent to all higher secondary schools in Delhi. Out of a total of 340 schools, 135 returned the questionnaire. The composition of the sample of schools replying to the questionnaire is given in Appendix III. 1.

In all, 458 teachers sent replies. The percentages of female and male teachers were 53 and 47 respectively. The teaching experience of the teachers represented a long range, details of which are provided in Appendix III. 2.

OUTCOME

The study has pooled the thinking and experience of a fairly large number of teachers, principals and educational administrators in Delhi on the following aspects of the problem:

- —the definition of a large class.
- —the problems of a large class for effective teaching.
- – effective ways of classroom organization.
- – useful methods of teaching and working with children in a large class.
- —specific suggestions on teaching Hindi and mathematics effectively in a large class.

LIMITATIONS OF THE STUDY

The study was designed as a pilot-study of an exploratory nature and has, for the time being, avoided a rigorously scientific approach. Thus, the study did not seek to arrive at a systematic and agreed definition of either a 'large class' or 'effective teaching'. It satisfied itself with the description the groups associated with it gave these two basic points.

REPORT

It will appear from the above that opinions were collected from three different sources:

- —a selected group of principals and inspectors by actually meeting them in a group
- —two selected groups of teachers—one teaching mathematics and the other teaching Hindi also through a meeting, and
- —a large group of teachers from all over Delhi through the questionnaire.

All these opinions have been pooled together, and in chapter II, an attempt has been made to report them under several broad heads.

Chapter III discusses some implications that arise out of the group reports and the responses to the questionnaire which indicate some practical steps that may be taken to mitigate the difficulties of the working teacher in the matter of handling **large classes.**

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CHAPTER II

SUMMARY OF OPINIONS

The following pages provide a summary of the responses received—either in meetings or through the questionnaire—on the different aspects of the problem and its solution.

I. A LARGE CLASS

The Delhi Directorate of Education prescribes 40 students for a class at the higher secondary stage and allows an additional section for mathematics and Hindi only when this number is exceeded. In the middle classes the prescribed number is 45 but a break-up into two sections is permitted only when the number exceeds 55.

The group of *Inspectors and Principals* defined a large class as follows:

- —In middle and higher secondary schools a class with more than 30 children may be regarded as a large class.
- —In primary schools a class with more than 25 children may be thought of as a large class.

– For oral and practical work in subjects like science, groups beyond 15 may be considered large.

Teachers. The largest number of teachers' opinions (39·5 per cent) define a large class as one which exceeds 30 students. A large majority (63·5 per cent) of teachers, however, define it as one with more than 30 to 35 students. (Appendix III. 3).

Among teachers of class VI and class IX, the largest number in both groups (37·3 per cent and 41·8 per cent respectively) favour 30 as the manageable limit of a class. A large majority of class VI teachers (62·3 per cent) as well as class IX teachers (65·0 per cent) define a large class as one having more than 30 to 35 students. The total number of class IX teachers (63·2 per cent) fixing the manageable limit between 20 and 30 is slightly higher than that of the class VI teachers (57·3 per cent).

Among mathematics and Hindi teachers, the largest percentage of opinions from each group favour 30 as the limit of a manageable class. A large majority of mathematics (66·3 per cent) and Hindi (57·2 per cent) teachers define a large class as one having more than 30 to 35 children. In class VI as well as class IX more mathematics teachers (60·0 per cent and 67·3 per cent respectively) favour classes with 30 students or less than Hindi teachers (54·6 per cent and 59·1 per cent respectively).

Among boys', girls' and co-educational schools, the largest number of teachers in each group define a class with more than 30 students as a large class. A large majority of teachers from boys' schools (63·6 per cent) define a large class as one having more than 30 to 35 children. A large majority of teachers from girls' schools, (63·3 per cent) and co-educational schools (82·8 per cent), however, define, a large class as one having more than 20 to 30 students. On the whole, teachers in co-educational schools indicated the greatest preference for smaller classes, and teachers in girls' schools more preference for smaller classes than those in boys' schools (Appendix III. 4).

Among urban and rural school teachers, the largest number of teachers in each group fix 30 as the limit of a manageable class. (Appendix III. 5). A large class is defined by a great majority of urban school teachers (65·6 per cent) as one having more than 30 to 35 students, and by that of rural school teachers (61·1 per cent) as one which exceeds 20 to 30 students. The percentages of rural school teachers fixing the limits of a manageable class at 20 (10·4) and 25 (16·9) are higher than the corresponding percentages of urban teachers (6·9 and 12·4). But while more rural teachers favour smaller classes, the percentage of rural teachers (18·2) suggesting the limits beyond 35 is a little higher than the corresponding percentage of urban teachers (15·2). Hence there is no decisive evidence to conclude that the concept of a large class varies with urban and rural school teachers.

In both groups, urban and rural, more class IX teachers favour classes with 30 or less students than class VI teachers. Among rural school teachers this difference is greater. 69·5 per cent of class IX and 53·7 per cent of class VI teachers define a large class as one with more than 20 to 30 children.

Among teachers teaching in pucca buildings and in tent schools, the largest percentage of teachers in each group define a large class as one having more than 30 children (Appendix III. 6). The percentage of tent school teachers (21·3) fixing the manageable limit at 25 is very much higher than the 'building' school teachers (9·7). This, though significant, does not warrant any definite conclusion in view of the higher percentage (14·8) of the tent school teachers fixing the limit at 40.

CONCLUSION

There could be no complete unanimity on the definition of a large class which could suit every teacher, every class, every subject and every situation. In the group which met for consultation, the majority regarded 30 students as the limit beyond which a class should be called large. 63·5 per cent of the teachers answering the questionnaire defined a large class as one which had more than 30 to 35 students.

Among the latter, some teachers as groups show a tendency to favour smaller classes, as for example, more class IX teachers than class VI teachers; more mathematics teachers than Hindi teachers; more teachers of co-educational schools than any other group; more teachers in girls' schools than those in boys'; schools more teachers from rural areas than from urban.

II. MAGNITUDE OF THE PROBLEM IN DELHI

Teachers of 521 classes or sections participated in the study. An analysis of their replies to the questionnaire shows that about 70 per cent of the classes (VI and IX only) they teach, have more than 35 children. This means that according to their definition, in 70 per cent cases they face the problem and have to solve it themselves (Appendix III. 7).

The group of principals and inspectors thought that the problem was more acute:

(i) in classes VI and IX which usually take a large number of new entrants, and also

(ii) in classes VIII and XI which are examination classes and concentrate more on the percentage passes.

They also felt that the classes in Hindi and English experienced the greatest difficulty followed, in order by mathematics, science, fine arts and social studies.

III. EFFECTIVE TEACHING

While in the interests of the study a workable definition of effective teaching was necessary, the subjective replies of the teachers did not afford much scope in that direction. The groups which met for consultation, however, came to some agreed conclusions and described rather than defined it. The group of principals and inspectors laid down the following broad criteria to determine what is effective teaching. Effective teaching, they thought, should:

(i) result in active learning habits in pupils,
(ii) involve the active participation of children in class,
(iii) promote the ability to learn and to express clearly,
(iv) lead to habits of self-study,
(v) stimulate, and draw out, the latent potentiality in each pupil,
(vi) help pupils to acquire knowledge,
(vii) foster in pupils the ability to apply knowledge,
(viii) bring about an impact af learning on behaviour,
(ix) encourage the development in pupils of a scientific attitude on things.

The groups of Hindi and mathematics teachers drew up separately lists of abilities they try to develop in pupils through their teaching.

HINDI: These abilities are:

1. **Ability to speak**

This includes

—Ability to pronounce words correctly.
—Ability to make correct use of grammar in speech.
—Ability to speak with appropriate expression.
—Ability to tell a connected story.
—Ability to converse freely.
—Ability to speak before an audience.

2. **Ability to read**

This includes

—Ability to pronounce words properly.
—Ability to read with proper emphasis and intonation.
—Ability to follow punctuation marks.
—Ability to read a poem with proper rhythm and to recite poems.
—Ability to read silently with speed.
—Ability to read plays properly.
—Ability to understand what is read in respect of grammatical aspects, gists of matter read, new words, etc.

3. Ability to write well

This includes

- Ability to write legibly and well.
- Ability to use correct language.
- Ability to spell correctly.
- Ability to make appropriate use of idioms, proverbs and common sayings.
- Ability to write correctly what they hear.
- Ability to write precisely and relevantly.
- Ability to correspond.
- Ability to express one's thoughts through writing.
- Ability to write summaries of matter read.
- Ability to develop outlines.
- Ability to develop a style of writing and expression.

MATHEMATICS: The following abilities were listed:

- Knowledge and understanding of concepts.
- Development of a mathematical vocabulary.
- Ability to generalize and arrive at rules and formulae.
- Ability to solve problems.
- Ability to reason logically.
- Ability to evaluate one's own work through verification.

A study of the answers to the questionnaire revealed that, by and large, teachers were apt to interpret 'effective teaching' in a very limited manner.

IV. FACTORS INFLUENCING EFFECTIVE TEACHING

In their replies to the questionnaire, teachers point out the following factors that usually come in the way of effective teaching:

- Unsuitable school buildings.
- Unsuitable location of schools.
- Unsuitable classrooms.
- Unsuitable and inadequate furniture and equipment.
- Syllabuses and textbooks as they are today.

—Inadequate library facilities.
—Exigencies of the school time-table.

V. PROBLEMS OF LARGE CLASSES

The problems of large classes may be classified under:

- Instructional Problems.
- Psychological Problems.
- Administrative Problems.

In addition, Hindi and mathematics present some special problems of their own. All these are detailed below:

1. Instructional Problems

- individual instruction
- teacher load
- needs of the weak and the bright students
- evaluation of students' comprehension
- drill and practice in class
- limited educational objectives
- supervision of pupils' class and home-work.
- school time-table.

2. Psychological Problems

(a) For students:
- discipline in class
- truancy
- feeling of neglect in a crowd
- lack of contact with the teacher.

(b) For teachers:
- frustration arising out of physical exhaustion resulting from overwork and strain.

3. Administrative Problems

- Lack of proper school buildings, adequate classroom furniture and equipment and library facilities.

Large classes and mathematics. The teaching of mathematics must of necessity be largely logical in the sense that it is often not possible to proceed until the previous step is mastered. Large classes stand in the way of ensuring whether the previous step is mastered by all.

Large classes and Hindi. Large classes make it difficult for the Hindi teacher to pay individual attention to :

—improvement in handwriting
—correction of pronunciation
—development of expression—oral and written
—building up critical appreciation, particularly, of poetry.

VI. SUGGESTIONS ON HANDLING LARGE CLASSES

The teachers were asked how they solved the problem of large classes. The answers indicate a wide variety of ways and methods adopted by them. The practices and suggestions mentioned in the answers are listed below:

A. Suggestions on Classroom Organization

1. *Furniture* :

—Provision of a single desk for each child, space allowing.
—A raised platform for the teacher to stand upon.

2. *Special subject-rooms*:

—Hindi room equipped with grammar, vocabulary and other charts; magazines; newspapers; children's dictionaries, pictures of writers and poets.
—Mathematics room equipped with big wall blackboards; mathematical charts of important geometrical figures and instruments; charts of formulae from algebra, arithmetic and trigonometry permanently hung on the walls.

3. *Arrangement of seats in the classroom*:

—'U'-shaped or semicircular arrangement of seats, which helps in reducing the distance between the teachers and the back-benchers. This arrangement is suitable only when the room is large.

- —Straight rows facing the teacher when the room is small.
- —Leaving enough space between rows of desks for the teacher to move about and supervise classwork.
- —Theatrical arrangement of seats, i.e., arranging seats in galleries.
- —Arranging seats so that the light is on the blackboard and not on the faces of the children.

4. *Plan of seating the children*

- —Seating children with weak eyesight in the front row.
- —Seating mischievous students on the left-hand side of the teacher to enable him to keep an eye on them even while he writes on the blackboard.
- —Seating one bright student with one or two weak students to render mutual help possible.
- —Seating students according to height—tallest students to sit on the back benches.

B. Suggestions on Teaching Aids Found Useful for Large Classes

- —Television and radio for poetry lessons, dramatization and improvement of pronunciation.
- —One wall-size big blackboard or two blackboards in a classroom.
- —Models and charts of big size.
- —A good school library equipped with (a) reading materials for children of different levels and (b) enough sets of books.
- —Projectors, filmstrips and motion pictures.

C. Suggestions on the Time-table for Large Classes

- Higher Secondary schools located in the same neighbourhood may collaborate to offer different subject-groups so that too much diversification may be avoided in the time-table of one school.

- —Extra periods may be made available for weak students.
- —Two continuous periods may, as far as possible, be provided for mathematics and Hindi essay-writing and grammar.
- —The duration of a single period may not be less than 35 minutes.
- —Mathematics may be allotted time in the first part of the school-day and in the higher classes, 14 periods in a week.
- —It would help if the mathematics teacher has a total teaching load of 32 periods in the week and is allowed a free period after every three periods of teaching. He may also continue with the same groups of students for as many years as possible.
- —A Hindi teacher may teach more efficiently if he teaches not more than five sections in all.
- —Teachers of Hindi and mathematics may not be overloaded with many school activities other than teaching.

D. Suggestions on Ways and Methods of Teaching

- —Homogeneous sections based on students' academic achievements may help in neutralizing a wide variation among students.
- —Careful pre-planning of work and preparation by the teacher can save time for attending to the individual needs of children.
- —The teacher has to be active and standing in the class for most of the time.

—Children's interest may be sustained by involving them in classwork in the following ways:

(i) Developing mathematical concepts in the class with the help of the students. This is possible if the teacher elicits steps and solutions from the students and proceeds slowly in the beginning of the lesson in order to take the whole class with him. Later he can go a little faster. This is found specially useful in helping students to grasp the concepts better, establishing relationship between what they already know and the new concepts and making out whether or not they are following the lesson.

(ii) Inviting individual students to solve questions on the blackboard.

(iii) Giving children an opportunity to find out answers for themselves. Problems and projects on which children can work independently may also be suggested.

(iv) Some of the difficulties and problems pertaining to indiscipline, sanitation, etc., may be discussed with the children and self-discipline may be stressed through student government.

5. The following teaching-techniques have been reported to be found useful for large classes:

—Lecturing to the class.

—Liberal use of questioning.

—In poetry as well as prose lessons, group recitals to improve reading and pronunciation.

—Spelling games.

—Encouraging self-study with references suggested by the teacher.

—Liberal use of the blackboard, charts, models and other teaching aids.

— Group work.

Working in small groups has been reported by the largest number of teachers. The responses received detailed purposes for which small groups are employed and the methods in which they are organized. It may be worth-while to give below a summary of the responses of teachers.

The size of a group recommended by teachers varies from five to eight. The reasons given for the organization into small groups are: 'students feel more sense of responsibility' and 'it gives them a sense of psychological security'. The purposes for which small groups are employed have been stated as follows:

- —to encourage students to help one another within a group,
- —to assign practice work to be done under the leadership of a bright student in the group,
- —to arouse a healthy spirit of competition in the matter of composing poems, writing essays, speaking, story-telling, solving mathematical puzzles and playing mathematical games, etc.,
- —to give additional help, especially, to weak students,
- —to help remedial instruction,
- —to discuss common mistakes,
- —to set handwriting exercises,
- —to check written and homework. The teacher checks the work of the leader who in turn checks that of the members of the group,
- —to facilitate revision,
- —to encourage discussions,
- —to assign different projects to different groups,
- —to make it easy for the teacher to give close attention to each group by rotation.

Some methods of organizing groups are also interesting, although the organization is closely linked with the purpose. Usually, homogeneous groups are formed, the homogeneity being that of:

- —level of performance, understanding and intelligence

- —common interests, e.g., children in reading, writing or speaking to pursue library reading, recitation or debates or some similar activity
- —residence, e.g., children in the same locality meeting at a place after school hours to study together or to complete assignments.

By and large, it appears that teachers favour homogeneous groups with one outstanding student in each. This student is either the leader or the monitor, deputizing the teacher in matters instructional. Teachers, however, emphasize that in such cases they are never absolved of their responsibility, which is finally theirs.

Some teachers like to maintain performance curves for the groups and also the individuals in them and to reward good performances with public appreciation of the effort.

6. Drill and Practice Work

1. For mathematics a teacher may
   - (i) do more of oral work in class after a new concept has been explained.
   - (ii) assign different questions to different rows of students to avoid cheating and copying.
   - (iii) set homework for practice during holidays.
2. To avoid the danger of copying Hindi essays, a teacher may require the students to write the composition in the class or choose new topics not included in the usual helpbooks.

7. Incentives

- —Marks or remarks may be given on daily work.
- —Class and group competitions may be organized in essay-writing, recitation of poems, spelling and solving mathematical problems.
- —Good work done by individual students may be displayed on the bulletin board.
- —Class magazines may be developed and children encouraged to contribute articles to them.

—Good articles written by children should be put on the wall magazine to be read by others.

8. Special Attention to the Weak and Bright Students

—Special classes for weak students.

—After teaching a lesson, a teacher may put up his lesson notes and diagrams on the notice-board to help the slow students to copy out and follow what they may have missed in class.

—Work done by the weak students may be kept apart to be checked thoroughly.

—Special extra assignments may be given to the bright students.

—References for advanced reading may be suggested to bright children.

9. Minimizing the Work-load of the Teacher

(*a*) *Correction load*

—Mass correction: Through exchange of notebooks children can be depended upon to correct their written work specially in mathematics, grammar, translation exercises and objective-type questions in language.

—Help of the brighter children may be sought in correcting the work of small groups of children under the supervision of the teacher.

—Spelling mistakes may be written on the blackboard and habits of self-correction encouraged.

—Common mistakes may be noted and explained on the blackboard.

—For the correction of dictation exercises in class, the children may exchange their notebooks, consult books and make corrections.

—Children may not be required to write long essays in Hindi.

—A Hindi teacher may so plan the work that he does not get more than four sets of written work per week for correction. These may include one precise, one essay, one grammar, one translation or letter-writing exercise.

—A mathematics teacher may give two types of home work. About four or five questions may be assigned to be done in the regular exercise-book. These should be thoroughly checked and corrected by the teacher. A few more questions may be given for practice to be done in the practice-work notebook. This note-book should be checked to ensure that the student has done the sums but it need not be corrected.

—While correcting answer-books, the teacher may correct about 15 books at a time or correct a few questions from each. It helps him in making a list of common mistakes to be explained to the whole class and also in finding out the difficulties of individual students.

—In Language exercise, a teacher may concentrate only on one aspect at a time, e.g., in one week grammar mistakes may be pointed out, in the second week spelling, in the third week style, and so on.

—In mathematics, homework may be discussed in the class and some oral hints given.

—In language correction as little drastic change as possible may be made.

—Abbreviations may be used to indicate mistakes.

—Language mistakes can be minimized if the teachers of other subjects also correct spelling and grammar mistakes.

—A teacher may work out an assignment time-table so that his correction work is evenly distributed through the week.

—While planning the school time-table, care may be taken that teachers who are qualified in two or three subjects get two or three different subjects, all of which do not involve heavy correction load like mathematics or language.

- Objective-type questions and tests may be more frequently used.
- A separate additional teacher may, where possible, be appointed to assist in correction work.

(*b*) *Seeking the help of the students*

- A monitor may be appointed for each row of students to look after sanitation and discipline.
- The help of the monitors may be sought in following up the assignments given by the teacher.
- The brighter students may help the weaker ones after completing their work.
- Students by rotation may be made responsible for marking periodwise attendance.

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CHAPTER III

IMPLICATIONS FOR FURTHER WORK

This study, as was pointed out earlier, was of the nature of a pilot study, meant to help us with a greater insight into the problem. Even then, it has some very clear indications to the remedies that may be suggested and to some concrete suggestions that may help to mitigate the diverse difficulties.

Future work that needs to be done in this regard will fall under two heads: Rigorous Research and Practical Hints on Classroom Organization and Teaching methods. Both these may be dealt with separately.

RIGOROUS RESEARCH

1. It is necessary to conduct systematic studies and experiments in order to ascertain the optimum number of pupils in a class, which may vary from subject to subject, activity to activity and, of course, stage to stage.
2. Effective teaching may also be defined in as concrete terms as possible. Unless that is done, the aim of the teacher in the classroom will continue to be nebulous and

divergent. The goal must be clear to everyone who seeks to achieve it.

3. Following from this comes another study to inquire into the qualities that a teacher needs to develop to handle large classes effectively for purposes of fruitful instruction.

4. Also, are needed full-scale studies on and investigations, into, methods of teaching different subjects to different classes.

PRACTICAL HINTS ON CLASSROOM ORGANIZANION AND TEACHING METHODS

While the first type of work is fundamental and essential, the problem of large classes cannot afford to wait. Teachers, who now on their own are solving the problem as best as they can have to be helped with practical suggestions on doing better what they are doing today. To achieve this purpose, it is imperative that small pamphlets be prepared to deal systematically with what teachers are doing without guidance and expert knowledge.

A few subjects on which such pamphlets may be prepared are:

—Individualizing Instruction
—Grouping and Organizing Group-work.
—Correction of Written Work
—Methods of Self-study
—Assignments and Homework
—Programmed Instruction and Large Classes
—Team-teaching and Large Classes

In addition to these, it may also be necessary to help the school administrator and the principal with some suggestions on such matters as

—School Building
—Classroom Equipment
—Classroom Furniture

—Lists of Books and Teaching Aids
—School Time-table
—Organizing Parent-teacher Associations.

The problem is already of great magnitude and needs to be attacked on several fronts to prevent it from going completely out of hand.

* * *

APPENDIX I

CLASS-SIZE AND EFFECTIVE TEACHING

A WORKING PAPER

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The size of the class is often cited as a hindrance in the adoption of effective teaching methods. It is popularly believed that the size of a class should be such as can be managed on the basis of individual attention by the teacher. No scientific studies on the optimum size of a class have been done or reported in this country. In the U.S.A. most of the studies before 1925 and a few since then have sought to relate class size to measurable student achievement.[1] The more recent studies, however, do not favour the popular belief. Goodlad on the basis of his study,[2] points out that there is nothing in the evidence to suggest that large classes materially affected attainment in the subject-matter under teaching techniques considered typical at that time. He quotes another study[3] to say that subsequent studies of the relation of class-size to student attention, discipline, self-reliance, attitudes and work habits failed to establish a research basis for decisions on class size. Spitzer[4] made a study of the class-size and pupil-achievement in reading comprehension, study skills, language and arithmetic skills for grades III and VI He concluded that class-size is not a factor in achievement.

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1. Goodlad, John I., Class-room Organization, *Encyclopaedia of Educational Research*, (Harris, Chester, W. Ed.), New York. The Macmillan Co., 1960. P. 224.
2. Goodlad, John I., Room to Live and Learn: Class-size and room space as factors in the learning-teaching process. *Child Education* 30, 1954 pp. 355-61.
3. Otto, Henry J. and others. *Class size Factors in Elementary Schools*, University of Texas, 1953, p. 175.
4. Spitzer H.F., Class size and pupil achievement in elementary schools, *The Elementary School Journal* Vol. IV. No. 1. Sept, 1954. pp. 82-86.

The conclusions stated in the preceding paragraphs do not, however, mean that there are no advantages in small classes. All these studies have been made in a very different context where even the definition of a large class may not be similar to our large classes. The enrolment in our schools has been expanding rapidly. Consequently, the number of pupils in classes has increased and classes are becoming large-sized. How large the classes actually are in different schools is not exactly known. No documents give a comparative picture of the size of classes in different States. State Departments of Education have prescribed the size of a class based on practical considerations and experience. The advantages generally claimed for a small class are:

—Teacher's ability to give more time to individual pupils

—Better instructional situation for pupils because the task of teaching is less difficult and it makes for higher morale of the teacher.

—A less formal instructional programme is possible.

—The routine teaching activities do not take an undue proportion of time.

If the advantages claimed for small classes are accepted, the questions to be investigated are:

How small should the class be ?

Should the size of the class differ from subject to subject ?

Should the size of the class differ for children of different age-groups ?

Hardly any research has been reported in our country on this subject.

Class-size is only one of the variables in the teaching-learning situation. How far reduction of class-size can contribute to effective teaching remains to be investigated. As things stand, reduction of class size means construction of more classrooms and appointment of additional teachers. The problems to be studied, therefore, are:

> Is it possible to find out ways and means of so organizing the school work that disadvantages of large classes are mitigated ?
>
> Are there some subjects in which a small class is more essential than in other subjects ?
>
> Are there methods of teaching which can overcome the disadvantage of large classes ?

Effective teaching is the resultant of a number of complex variables. One obvious condition of learning is the classroom teacher who has the major responsibility for devising learning experiences. His personality and characteristics are important factors. Studies have indicated that there is a close relationship between teacher's knowledge and pupils' learning.

Bassham[5] found that teachers' understanding of mathematical concepts was significantly related to pupils' gains in arithmetic for those classified above the class-mean, but not for those below. The teachers' attitudes and behaviours also influence pupils' learning. This was shown at least with regard to emotional tones. Torrance and Mason[6] studied the effects of various approaches on a sample of Air Force personnel and concluded that a direct 'take-it or leave-it' approach was more effective than personal persuasiveness or setting an example. They also found that attempts to influence attitudes were more effective in the instructor's official role than in his personal role.

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[5] Bassham, Harrel C., 'Relationship of pupil gain in arithmetic achievement to certain teacher characteristics'. Doctor's thesis, Lincoln University of Nebraska, 1960. Abstract ; *Dissertation Abstracts* 21 : No. 7, 1961. pp. 1839-40.

[6] Torrance, E. Paul and Mason, Raigh, 'Instructor effort to influence ; An Experimental evaluation of six approaches', *Journal of Ed. Psy.* 49 : August, 1958. pp. 211-18.

The other important variable in effective teaching is teaching methods. Research dealing with method variables involves classroom organization, presentation procedures and methods of evaluation and grading. Variations in classroom organization usually include such methods as grouping, team-teaching and ungraded classes. Presentation procedures included independent study, project methods, lecture discussion, recitation and usually teaching style variables, i.e., how a teacher encourages a pupil to learn through discovery.

In a fair proportion of recently completed studies on method variables, results from experimental and controlled methods did not show statistically significant differences. Inferences should, therefore, be drawn with caution. Lack of statistically significant difference does not, however, imply that methods are equally good or indifferently appropriate. Demonstrating the effectiveness of a particular teaching method requires highly sensitive procedures in design and analysis. This is so because besides 'method' many other variables or co-variates like teacher, class-size, student, teaching equipment, etc., simultaneously determine learning which in turn has many facets like knowledge, attitudes, and skills. In order to show differences between methods it should be possible to measure exactly how much each co-variate contributes to which facet of learning. Simple statistics is not enough to determine these differences. The same thing has been expressed by Bowers and Soar[7] when they noted that before differences in method variables can be shown, concern must be manifested for the large number of measurable complex outcomes, for the numerous and elusive co-variates that mark true differences between methods, and for the frequent inability of simple statistics to make possible adequate analysis of the data.

The purpose for the attention given to classroom organization has presumably been to determine the conditions of grouping under which students learn most effectively. Other considerations which have played dominant roles are: ease of administration, economical use of teachers, teacher's satisfaction and such others.

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[7] Bowers, Norman D. and Soar, Robert S., 'Studies of human relations in the teaching-learning process,' *V. final report : Evaluation of Laboratory Human Relations Training for Classroom Teachers*, Nashville, Ten, Vanderbilt University 1961, p. 210

Ability-grouping is an attempt made to divide students into classes or within a given class according to their ability and attainment. The evidence, though of limited value, slightly favours ability-grouping in regard to academic achievement, with dull children seeming to profit more than bright children. The advantage to bright children comes when they are encouraged to cover the usual programme at a more rapid rate. Studies on ability-grouping in promoting achievement only when, for example, content is enriched. In fact, an analysis of many studies of ability grouping reported by Cornell[8] and Petty[9] and of several more recent studies[10], [11] suggests that curricular differentiation for the range of student-variability represented in a given group is a more significant contributor to academic progress than the basis for establishing classroom groups.

The two approaches to classroom organization on which a lot of thinking and experiments are being done currently are the ungraded school and team-teaching. The non-graded school is designed to implement a theory of continuous student progress. It is an attempt to help students of varying abilities to move ahead unhampered by uniform grade expectations.

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[8] Cornell, Ethell, 'Effects of ability grouping determinable from published studies'. (In the Grouping of pupils). *35th Year Book. Part I* N.S.S.E., 1936. pp. 289-304.

[9] Petty, Mary Clare, 'Intraclass grouping in the elementary school', *Doctor's thesis Uni. of Texas*, 1952.

[10] Holmes, Darrel and Harvey, Lois, 'An evaluation of two methods of grouping'. *Educational Research Bulletin*. 35 : 1956. pp. 213-22.

[11] Hoover, Kenneth. 'An experiment in grouping within the classroom'. *California Journal of Secondary Education* 30 : 1955. pp. 326-31.

The principal features of the team-teaching approach are:

1. Groups of students (from 50 to 200 but usually 100 to 125) meet to hear lectures. The teacher is allowed sufficient time to prepare these lectures.
2. Discussions are carried on in smaller groups under the supervision of teachers.
3. Students—individually or in very small groupspursue a course of independent study in laboratories libraries, etc.
4. Teachers are relieved of the time-consuming routine tasks by assistants, typists and clerks.

In team-teaching a group of teachers operate as a team in planning and giving instruction to groups of learners. The approach has assumed a variety of forms in different institutions. In some places the team is headed by a team leader who is considered a master teacher and is paid more highly than the other. The team has senior and junior teachers.

The other important aspect of the methods variable is the presentation procedures. Many different researches have been reported in this field. Manning[12] reported an evaluative study designed to develop a programme of instruction, 'to serve individual learning needs'. His data were analyzed in terms of the relative achievement of experimental and control groups of pupils in social studies, literature and science. Findings suggested that the effects of individualization procedures vary both with pupils and subject-matter area.

Several studies have been reported about the individual, small-group and large-group methods with different findings. In studying a group of 128 grade IV pupils, half working in groups and half as individuals, Hudgins[13] found no differences in individal problem solving. Siegel, Adams and Macomber[14] compared retention of information between two sample groups of college students matched on AGE Psychological Examination scores and found no significant differences in the effectiveness of large-group and small-group instruction. Blue[15] reported significant results in a study of college students in a sociology course. Students who studied in groups made higher achievement scores than students who studied independently. The data also indicated that all but the exceptional students improved when studying in an organized group. Barnlund[16] found that group decisions based on cooperative delibrations were superior to decisions made in individual setting or to decisions based on majority rule. The results were attributed to stimulation of greater task orientation and increased individual effort in the group setting. Hudgins[17] reported the same general result for fifth grade children who were found to solve more arithmetic problems in groups than when working alone.

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[12] Manning, John C., 'Differentiating instruction in the content subjects in the intermediate grades', *Journal of Education* 142, December 1959. pp. 52-65.

[13] Hudgins, Bryce B., 'The effects of group experience on individual problem solving', *Journal of Educational Psychology* 51, Feb. 1960. pp. 37-42.

The evaluation techniques have also been found an important method of promoting effective learning. Page[18] found that comments written on students' papers by secondary school teachers had a measurable and significant effect on students' effort, attitude and attention. Senior high school students were more responsive to teacher comment than were junior high-school students. Duel[19] found that when students were given periodic opportunities for self-evaluation, they made higher achievement scores than did students who were not given such opportunities.

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[14] Siegel, Lawrence, Adams, J.F., Macomber, F.G., 'Retention of subject-matter as a function of large group instructional procedures'. *Journal of Edu. Psy.* 51, Feb. 1960. pp, 9-13.

[15] Blue, John T., 'Effect of group study on grade achievement', *Journal of Edu Psy.* 49, June 1958 pp. 118-23.

[16] Barnlund, Dean C., 'A comparative study of individual, majority and group judgement', *Journal of Abnormal and Social Psychology*, 58, Jan 1959. pp. 55-60.

[17] Hudgins, Bryce B., 'Effects of group experience on individual, problem solving,' *Journal of Edu. Psy.* 51, Feb. 1960. pp. 37-42.

[18] Page, Ellis B., 'Teacher comments and student performance : a seventy four classroom experiment in school motivation', *Journal of Edu. Psy.* 49, August 1958. pp. 173-81.

That the effectiveness of a method varies from teacher to teacher was shown by another study. Wallen and Vowles[20] compared a non-grouping procedure with a grouping procedure for four classes of VI grade pupils in arithmatic, equated on the basis of pretest achievement scores. Although no significant differences were found between these procedures, significant differences were reported between teachers and for teachers by method interaction. The latter suggested that some teachers were more successful in using a given method than were others.

Students with different temperaments benefits from different study procedures and methods was shown by another study. Beach[21] used lecture, discussion and small-group and independent study procedures in organizing an advanced course in educational psychology. He concluded that the less sociable students achieved more by lecture and that the more sociable students achieved more by the small-group procedure.

Some other variables contributing to the effectiveness of the teaching-learning situation are the social interaction in the class and the social background of teaching. The interactive variables are those characterizing not the individuals related to each other in teaching but the field or relationship between them. Interpersonal perception, affection, and behaviour are examples here. The social background is provided by the

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19. Duel, Herey J. 'Effect of periodical self-evaluation on student achievement'. *Journal of Edu. Psy.* 49, August, 1958. pp. 197-99.

20. Wallen, Norman E. and Vowles, Robert O., 'The effect of intraclass ability grouping on arithematic achievement in the sixth grade', *Journal of Edu. Psychology* 51, June 1960. pp. 159-63.

21. Beach, Leslie R. 'Sociability and academic achievement in various types of learning situations', *Journal of Edu. Psychology* 51, August 1960. pp. 208-12.

teaching and administrative staff of the school and the school system, by the homes from which learners come, and by the community and society at large. All these forces in the social background affect teacher's behaviour.

Very few researches or scientific experiments have been reported in India. But good teachers and others have been in constant search for effective methods of teaching even in large classes. Some of the efforts and experiments of individual teachers have been reported in educational journals. Some suggestions based on experience have also been given in various articles and writings. Priest[22] faced with the problem of large numbers tried to evolve a system of suitably graded exercises written on cards for the teaching of arithmetic. A few lines from his article may well be quoted here: 'Effective teaching is intimately connected with the teacher's freedom and ability to introduce individualized learning situations in the classroom. It is not good enough to evade this requirement on the traditional argument that classes are too big or too heterogeneous. It can be argued convincingly that the larger the class, and the more heterogeneous, the more imperative it is in the interests both of the teacher's sanity and the pupil's progress, that individualized technique be adopted…………… The professionally aware and determined teacher can have much of his materials constructed in the classroom at a very low cost, and in the process improve his teaching and enhance his professional stature.' An experiment worked out in the St. Columba High School, Bombay,[23] suggests several effective methods of teaching, such as

(a) Children are encouraged to gather information.

(b) Children are encouraged to refer to simple books and magazines.

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22. Priest, Thomas A. 'Materials for self-instruction,' *Educational Form*. 2 (3) July 1957, pp. 1-3.

23. Zachariah. S. T., 'An experiment in social studies in standards' V, VI and VII. *Teaching*, 32 (3) March 1960. pp. 78-81.

(c) They observe and give reports.

(d) Many assignments are given to groups of children such as making of models, scrap books and production of plays.

(e) Visits to farms, factories and places of historical interest.

Mukerjee[24] suggests effective methods of teaching geography. Among the methods recommended are discussion of the syllabus with pupils, starting the lesson with the boys' personal ideas and experiences, use of questions and audio-visual aids.

Patel[25] reports an experiment in supervised study. He defines supervised study as the supervision by the teacher of a group or a class of pupils as they work at their desks or around their tables. Pupils are busy at work assigned to them by the teacher. They ask the teacher for assistance and direction when they meet with a difficulty they cannot overcome. The author concludes that the students have immense capacity and enthusiasm for work: only the teacher has to show his interest in children and create opportunities for them to prove their mettle. Jaya Suria[26] favours the project method and pleads that it satisfies many of the essential conditions of an ideal learning situation.

All such opinions expressed, suggestions given and the experiments reported need to be analyzed and pooled together in order that they may be made available to be tried and used widely by the practitioners.

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24. Goyal, Omprakash, Ragubir Dayal, Mukerjee and Batra, Prithvi Raj, 'How I teach it', *Secondary Education*, 11 (3) October 1952, pp. 27-31.

25. Patel, J. J., 'When pupils teach themselves'. *Progress of Education*, 33 (12) July 1959. pp. 381-84.

26. Jaya Suria. J. E., 'The project method and the ideal learning situation'. *Teaching*, 29 (4), June, 1957. pp. 131-32.

Whether or not the research done elsewhere is directly applicable to our situation, the nature of the problem of effective teaching and the variables involved as indicated by various studies would be the same everywhere. In the light of this discussion of the problem and the variables, the problem as it faces our schools may be stated as follows:

> Although the exact size of the class in different parts of the country is not known, it is common experience that the number of students in a class has been increasing. The size of the class is often quoted as a reason for not being able to adopt better and effective teaching techniques. Considering our financial resources it may not be immediately possible to reduce class-size. The problem for the present study, therefore, is to define and state clearly in what ways a large class is a hindrance to effective teaching and to suggest ways and means of effective teaching in a large class.

SCOPE OF THE STUDY

The objectives and procedures of teaching depend on the psychological and social maturity of learners which are a function of grade level. The search for effective teaching methods in large classes through the present study will be limited to grades IX, X and XI. In terms of subjects, methods will be studied in relation to all the subjects taught at the higher secondary stage.

A study of the effective approaches to classroom organization and teaching is bound to be faced with difficulties because of the different perceptions teachers have about the educational function and desirable learning. The methods and attempts of the teachers are very often related to the goals they are aiming at. A teacher who wants to see his pupil able to repeat verbatim what is written in the book is likely to adopt very different methods from the teacher who would like his pupils to understand the problem and approach it critically. Therefore, it may be imperative to evolve a suitable description of the learning concepts which may be used as reference in terms of which effective teaching techniques may be evolved. The *specific purposes* of the present study may, therefore, be stated as follows:

1. To define learnings expected of children of grades IX, X and XI.
2. To suggest effective ways of classroom organization and procedures to mitigate the effects of a large class.
3. To suggest effective methods of teaching in large classes including the use of teaching aids.

PROCEDURE

The study could be approached in two ways. One, experimental and control groups could be set up in a few selected schools for the teaching of various subjects at different grade levels; such a scientific study may result in some scientific conclusions for the groups under study. But looking to variables involved, and our urgent needs, the practical utility of this approach may be doubted. The methods found suitable in one situation can hardly be guaranteed or generalized for other situations. In the absence of scientific measuring tools it may be difficult to measure the differences between methods Again, the results of research, however scientific, take several years before they begin to be used in schools. But looking to the needs of our situation in which we want practical suggestions based upon experience and study to reach our teachers widely and to be used freely on a large scale, a more practical approach needs to be adopted. We need a mass awareness on the part of our teachers of the need for improved teaching and their involvement in the search for effective ways and means within the present conditions of large classes taught as a whole. This would not only result in evolving effective methods but would also ensure to a great extent their use in the schools. A process which leads on to the search of effective methods through scientific studies resulting from the involvement of teachers can alone suit countries like ours which have to go at a fast pace necessitated by the present times. Hence the following alternative practical approach is being suggested.

The study may be covered through:

1. Workshops of teachers to
    a. define the expected learning outcomes,
    b. state clearly in what ways a large class is a hindrance and on what particular occasions,
    c. pool their thinking and experience on effective classroom procedures and methods of teaching in large classes.
2. Analysis of the research and literature on effective methods and classroom procedures.
3. Classroom experimentation by individual teachers and schools with the suggestions emerging through 1 and 2 above and sharing the experience through publications of the N.C.E.R.T.
4. Forming study groups of teachers to study and experiment with methods of teaching different subjects. Besides central meetings of these study groups to pool their experience, the study-groups could be helped to function effectively in the States through the Extension Services.

If the above approach is accepted, the following procedure and steps may be followed:

1. Analysis of effective teaching methods and classroom procedures in large classes through the study of relevant literature and studies.
2. Visits to some select local schools with large classes. Conferences with the staff of these schools to locate the actual problems faced by them due to the large size of the classes.
3. Preparation of working papers based on steps 1 and 2 for the teachers' workshops.

4. Workshop of teachers to
    - a. define the expected learning outcomes,
    - b. state clearly in what ways a large class is a hindrance and on what particular occasions,
    - c. Pool their thinking and experience on effective classroom procedures and methods of teaching in large classes.
5. Workshops of groups of teachers for suggesting effective methods of teaching in large classes in different subject areas.
6. Publication and distribution among schools of the findings resulting from the study and workshops.
7. Forming study groups of teachers in different parts of the country to experiment with the suggested ways and means and report their experience. This could be done through the Extension Service departments.

WHO MAY BE INVITED TO THE TEACHERS' WORKSHOPS ?

Teachers teaching grades IX, X and XI will form the main body of attendance. These teachers may be invited from all over the country. Besides teachers, some lecturers from teacher training institutions and school administration may also be helpful in these workshops.

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APPENDIX II

A QUESTIONNAIRE

Dear Teacher,

We all share a common concern for improving the quality of teaching in schools. Among many other factors the large size of the class often presents many problems and does not always allow us to teach in the way we would like to.

As things stand, the Delhi Directorate of Education prescribes 40 children per class at the higher secondary stage and allows an additional section for mathematics and Hindi when the number exceeds 40. In the middle grades the prescribed number is 45 but a break-up of the class is allowed only when it exceeds 55. The prescription of this class-size is obviously due to many more reasons than one. Considering our financial resources and the urgent need for extending educational opportunities to a large number of children, it may not be immediately possible to reduce class-size and the size of a class has to be large in our country for a number of years to come. It is, therefore, necessary to find ways and means of teaching and handling large classes.

Effective methods of teaching are difficult to be prescribed for all situations and times. Different methods may be effective with different groups of children, different teachers and different subjects.

Even for the same subject, a large class may be suitable for some type of work and unsuitable for other types of work. It may, therefore, be unrealistic to lay down a particular number to define a large class. Still, the exigencies of the situation today are such that we teachers have to fall back upon our own resources to teach effectively in what is vaguely called a large class. The purpose of this study is to lay our finger on that number which we think is the limit of a manageable class from the point of view of effective teaching. Any number of children in the class exceeding that number would mean a large class for purposes of our study. The present study is being confined to the teaching of mathematics and Hindi in classes VI and IX.

Keeping the above in mind, we would now request you to give replies to the questions given below. We may remind you again that we are not entering into any theoretical discussion. We would like you to recall to your mind your actual experience in the classes and base your replies on that.

1. School

   (a) Name and address of the School.
   (b) Is it a Girls' school or a Boys' school ?
   (c) Is it a rural school or an urban school ?
   (d) Is it located in a pucca building or in tents ?

2. Teachers who answered the questionnaire:

	Name	**Teaching Experience**
(a)		
(b)		
(c)		
(d)		

3. What size of the class would you consider large from the point of view of effective teaching ? Give the number of children.

Mathematics		Hindi	
Class VI	Class IX	Class VI	Class IX

4. Give the actual size of the class you are teaching at present. Give the number of children.

Mathematics		Hindi	
Class VI	Class IX	Class VI	Class IX

5. In what way does a large class present handicaps in effective teaching ?

(*Note*: Think of the things you would like to do to teach effectively, but are not able to do because of the large size of the class.)

(a) Mathematics (Class VI)

(b) Mathematics (Class IX)

(c) Hindi (Class VI)

(d) Hindi (Class IX).

6. What are some of the handicaps in the school that come in the way of your effective handling of the large class ?

(Here you could think of such handicaps as a smallroom, inadequate furniture, inadequate teaching aids and library books).

Mathematics		Hindi	
Class VI	Class IX	Class VI	Class IX

7. What are some of the important ways of arranging the classroom that you find helpful in handling a large class ?

(a) Mathematics (class VI)

(b) Hindi (class VI)

(c) Mathematics (class IX)

(d) Hindi (class IX)

8. What are some of the important ways and methods of teaching and working with children in the classroom that you find helpful in large classes, e.g., working in several small groups within the class ?
   (a) Mathematics (class VI)
   (b) Mathematics (class IX)
   (c) Hindi (class VI)
   (d) Hindi (class IX)
9. Do you find any aids helpful in overcoming the handicap of a large class ? If yes, name those teaching aids.
10. If you have any other suggestions for handling large classes effectively for the teaching of mathematics and Hindi, you may write below.

APPENDIX III. I

Composition of the Sample of Schools Replying to the Questionnaire

Classification of Schools	URBAN										RURAL										Grand
	Total	Pucca Bldg.			Tents			Partly pucca			Total	Pucca Bldg.			Tents			Partly Pucca			
		G	P	Total	G	P	Total	G	P	Total		G	P	Total	G	P	Total	G	P	Total	Total
Boys'	39	15	9	24	4	1	5	7	3	10	15	8	4	12	2	—	2	1	—	1	54
Girls'	62	25	17	42	8	1	9	9	2	11	3	1	—	1	1	—	1	1	—	1	65
Co-educational	7	—	6	6	—	—	—	—	1	1	1	1	—	1	—	—	—	—	—	—	8
Total	108	40	32	72	12	2	14	16	6	22	19	10	4	14	3	—	3	2	—	2	127

N.B. 1. 'G' refers to Government schools and 'P' to private.
2. In all 127 answers have been tabulated, 8 not replying to this question.

APPENDIX III. 2

Teaching Experience of Teachers replying to the Questionnaire

Teaching Experience	Women Teachers	Percentage of the total sample	Men Teachers	Percentage of the total sample	Total of men and women teachers
Upto 2 years	65	14	38	9	103
2-5 years	58	13	53	12	111
5-10 years	54	12	39	8	93
Above 10 years	65	14	86	18	151
Total	242	53	216	47	458

APPENDIX III. 3

Teachers' Opinions on the Size of a Large Class

Number above which constitutes a 'Large Class'	PERCENTAGE OF TEACHER OPINIONS						
	Class VI			Class IX			
	Maths.	Hindi	Total	Maths.	Hindi	Total	Grand Total
20	5·5	6·4	5·9	11·8	6·4	9·1	7·5
25	12·7	15·5	14·1	10·0	14 5	12·3	13·2
30	41·8	32·7	37·3	45 5	38·2	41·8	39·5
32	1·9	—	0·9	—	3·6	1·8	1·3
34	0·9	—	0·5	1·8	0·9	1·4	0·9
35	21·8	25·5	23·6	19·1	20·9	20·0	21·8
38	—	—	—	—	0·9	0·5	0·3
40	10·0	11·8	10·9	9·1	9·1	9·1	10·0
42	0·9	0·9	0·9	1·8	0·9	1·4	1·2
45	4·5	4·5	4·5	0 9	2·7	1·8	3·2
46	—	1·8	0·9	—	—	—	0·5
50	—	0·9	0·5	—	1·8	0 9	0·7

APPENDIX III. 4

Teachers' Opinions on The Size of a Large Class

Girls', Boys', and Co-educational Schools

Number above which constitutes a 'Large Class'	PERCENTAGE OF TEACHER OPINIONS								
	GIRLS' SCHOOLS			BOYS' SCHOOLS			CO-EDUCATIONAL SCHOOLS		
	Class VI	Class IX	Total	Class VI	Class IX	Total	Class VI	Class IX	Total
20	7·3	9·1	8 5	8·2	7·2	5·5	6·3	15·8	11 4
25	15·6	12·1	13 7	12·6	13·0	12·9	12·5	10 5	11·4
30	41·3	41·7	41·1	27·4	39·1	32·5	68·8	52·6	60·0
32	0·9	0·8	0·9	1·1	4·3	2·5	0	0	0
34	0	2·3	1·2	1·1	0	·6	0	0	0
35	19·3	20·5	19 9	31·6	23·2	28·0	6·3	5·3	5·7
38	0	0	0	—	1·4	0·6	0	0	0
40	18·3	9·1	9·1	13·7	10·1	12·3	6·3	5·3	5·7
42	0·9	1·5	1 2	1·1	1·4	1·2	0	0	0
45	4·6	1·5	2·9	5·3	0	3·1	0	10·5	5·7
46	0	0	0	2·1	0	1·2	0	0	0
50	0·9	1·5	1 2	—	0	0	0	0	0

APPENDIX III. 5

Teachers' Opinions on the Size of a Large Class

Urban and Rural Schools

Number above which constitutes a 'Large Class'.	PERCENTAGE OF TEACHER OPINIONS					
	Urban Scools			Rural Schools		
	Class VI	Class IX	Total	Class VI	Class IX	Total
20	6·1	7·6	**6·9**	4·9	16·7	**10·4**
25	13·4	11·4	**12·4**	**17·1**	16·7	**16·9**
30	38·5	42·9	**40·3**	31·7	36·1	**33·8**
32	0·6	2·2	**1·4**	2·4	0	**1·4**
34	0	1·6	**·8**	2·4	0	**1·4**
35	24·0	21·2	**22·6**	21·9	13·9	**18·2**
38	0	0·5	**0·3**	0	0	**0**
40	10·6	9·2	**9·9**	12·2	8·3	**10·4**
42	1·1	0·5	**0·8**	0	5·6	**2·6**
45	3·9	1·6	**2·8**	7·3	2·8	**5·2**
46	1·1	0	**0·6**	0	0	**0**
50	0·0	1·1	**0·8**	0	0	**0**

APPENDIX III. 6

Teachers' Opinions on the Size of a Large Class

Pucca Buildings and Tents

Number above which constitutes a 'Large Class'.	PERCENTAGE OF TEACHER OPINIONS		
	Pucca Bldg.	Tents	Schools with Bldg. and Tents
20	7.4	0	13.6
25	9.7	21.3	19.8
30	41.3	31.3	38.3
32	1.0	4.9	0
34	1.3	0	0
35	23.5	16.4	19.8
38	0.3	0	0
40	9.7	14.8	7.4
42	1.3	1.6	0
45	2.7	8.2	1.2
46	0.3	1.6	0
50	1.0	0	0

APPENDIX III. 7

Actual Size of Classes in the Sample

Number of Students	FREQUENCY OF THE CLASSES					
	Mathematics VI	Mathematics IX	Hindi VI	Hindi IX	Total	Percentage
Less than 20	1	10	0	4	15	2·9
20 to 24	2	7	2	3	14	2·7
25 to 29	6	14	8	12	40	7·7
30 to 34	17	23	13	31	84	16·1
35 to 39	29	25	28	30	112	21·3
40 to 44	30	22	36	28	116	22·3
45 to 49	26	17	21	17	81	15·5
51 to 54	17	8	14	7	46	8·8
54 and above	3	5	3	2	13	2·5
Total ...	131	131	125	134	521	99·8

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APPENDIX IV. 1

Members of the First Committee

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2. Dr. M. B. Buch, Deputy Director, Directorate of Extension Programmes for Secondary Education, Delhi-6.
3. Dr. (Km) A. Nanda, Inspectress of Schools, Delhi Directorate of Education, Old Secretariat, Delhi.
4. Km. Ahalya Chari, Director, Reading Project, Department of Curriculum, Methods and Textbooks, New Delhi-12.
5. Shri T. S. Mehta, Field Adviser, Department of Curriculum, Methods and Textbooks, New Delhi-12.
6. Smt. Kamla Bhatia, Senior Research Officer, Department of Curriculum, Methods and Textbooks, New Delhi-12.
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9. Shri Anil Vidyalankar, Senior Research Officer, Department of Curriculum, Methods and Textbooks, New Delhi-12.
10. Km. Adarsh Khanna, Senior Research Officer, Department of Curriculum, Methods and Textbooks, New Delhi-12.

APPENDIX IV. 2

Members of the Second Group

1. Shri B. Ghosh, Head of the Department, Department of Curriculum, Methods and Textbooks, 5, West Patel Nagar, New Delhi-12.
2. Smt. G. Chawla, Assistant Director of Education, Zone I (Girls), B.4/6, Asaf Ali Road, New Delhi-1.
3. Shri Gian Chand, Inspector of Schools, Zone I (Boys), B. 4/6, Asaf Ali Road, New Delhi-1.
4. Shri E. Edward, Secretary, Inter-state Board of Education, A/114, Defence Colony, New Delhi-3.
5. Shri S. R. Gupta, Inspector of Schools, Zone IV (Boys), Directorate of Education, Old Secretariat, Delhi-6.
6. Dr. (Km) A. Nanda, Inspectress of Schools, Zone III, Directorate of Education, Old Secretariat, Delhi-6.
7. Shri K. C. Singh, Deputy Inspector of Schools, Directorate of Education, Old Secretariat, Delhi-6.
8. Smt. S. Singh, Principal, Govt. Higher Secondary School No. 2, West Patel Nagar, New Delhi-12.
9. Smt. S.D. Soundram, Vice-Principal, St. Thomas Girls Higher Secondary School, Mandir Marg, New Delhi.
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11. Shri Anil Vidyalankar, Senior Research Officer, Department of Curriculums, Methods and Textbooks, New Delhi.
12. Km. Adarsh Khanna, Senior Research Officer, Department of Curriculum, Methods and Textbooks, New Delhi.
13. Shri R.C. Sharma, Senior Research Officer, Department of Curriculum, Methods and Textbooks, New Delhi.

APPENDIX IV. 3.

Mathematics Teachers

1. Smt. Chopra, Mathematics Teacher (VI), Rai Kedar Nath Higher Secondary School, Karol Bagh, New Delhi-5.
2. Shri G.C. Khanna, Mathematics Teacher (VI), L.N. Girdhari Lal Higher Secondary School, Bagh Deewar, Chandni Chowk, Delhi-6.
3. Shri J. M. Joshi, Mathematics Teacher (VI), Government Model Higher Secondary School-1, Lajpat Nagar, New Delhi-14.
4. Shri Krishan Dev, Mathematics Teacher (VI), Government Model Higher Secondary School, Ludlow Castle, Delhi.
5. Shri D.K. Jain, Mathematics Teacher (IX), Government Higher Secondary School for Boys, Kingsway Camp, Delhi-9.
6. Smt. M. Bawa, Mathemetics Teacher (IX), Rai Kedar Nath Higher Secondary Girls' School, Karol Bagh, New Delhi-5.
7. Km. Tripta Kohli, Mathematics Teacher (IX), Government Girls' Higher Secondary School, Moti Nagar, New Delhi-15.
8. Shri S. R. Goyal, Mathematics Teachers (IX), D.A.V. Higher Secondary School, Darya Ganj, Delhi-6.

Hindi Teachers

1. Shri Sant Lal, Hindi Teacher, (IX), Govt. Boys' Higher Secondary School, Mori Gate (Ist Shift), Delhi-6.

2. Smt. L. Lohani, Hindi Teacher (IX), Government Girls' Higher Secondary School No. 2, Tilak Nagar, New Delhi-15.
3. Shri A. H. Khullar, Hindi Teacher (IV), D.A.V. Higher Secondary School, Darya Ganj, Delhi-6.
4. Shri O.P. Gupta, Hindi Teacher (IX), Government Model Higher Secondary School No. 1, Lajpat Nagar, New Delhi-14.
5. Shri Jai Gopal, Hindi Teacher (VI), Government Boys' Higher Secondary School, Shaktinagar-I, Delhi-6,
6. Smt. Chandra Kanta Melhotra, Hindi Teacher (VI), Government. Girls' Higher Secondary School No. 1, Patel Nagar, New Delhi-12.
7. Shri Mahesh Chandra Sharma, Hindi Teacher (VI), A.S.V.J. Higher Secondary School, Darya Ganj, Delhi-6.
8. Shri Pratap Singh, Hindi Teacher (VI), Government Model Higher Secondary School No. 1, Sarojini Nagar (Vinay Nagar), New Delhi.